1998–99 CATS ASSESSMENT
Open-Response Item Scoring Worksheet

Grade 4—Science

The **academic expectations** addressed by "Meat-Eaters and Plant-Eaters" are

2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

2.4 Students use the concept of scale and scientific models to explain the functioning and organization of living and non-living things and predict other characteristics that might be observed.

The **core content** assessed by this item includes

Content

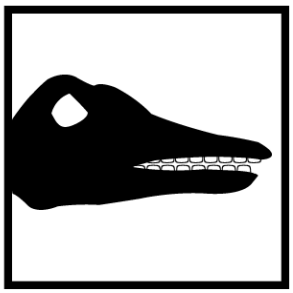
- Each plant or animal has structures which serve different functions in growth and survival.

Inquiry

- Scientists develop explanations using observations (evidence) and what they already know about the world. Reasonable explanations are based on evidence from investigations.

Meat-Eaters and Plant-Eaters

Characteristics such as head shape, eye position, and type of teeth help scientists decide if fossilized animal remains come from a meat-eater or a plant-eater.



Look at the pictures above. Describe which animal was a meat-eater and which was a plant-eater. Use EACH animal's characteristics to explain your answer.

SCORING GUIDE
Grade 4 Science

Score	Description
4	The response is complete and shows a solid understanding of the differences in the head features of animals that are carnivores and herbivores. The identification of the meat-eater and the plant-eater is correct and there is an explanation (with some details) based on the animals' characteristics.
3	The response shows an understanding of the differences in the head features of animals that are carnivores and herbivores. The identification of the meat-eater and the plant-eater is correct, and there is general explanation based on the animals' characteristics. The response may contain minor errors or misconceptions.
2	The response shows a limited understanding of the differences in head features of animals that are carnivores and herbivores. The identification of the meat-eater and the plant-eater is correct but the explanation related to the animals' characteristics is limited. The response may contain errors, misconceptions, and omissions.
1	The response is incomplete and shows a minimal understanding of the differences in head features of animals that are carnivores and herbivores. There may be an attempt to identify the meat-eater and the plant-eater or to explain the features, however, the response contains major errors, misconceptions, or omissions.
0	The response is totally incorrect or irrelevant.
Blank	No response.

Science Behind the Question:

Grazing animals have eyes on the sides of their heads to see danger approaching from the sides. In addition to the position of the eyes, the teeth are different. The sharp-teeth would indicate a meat-eater.

ANNOTATED STUDENT RESPONSE
Grade 4 Science

Sample 4-Point Response of Student Work

Student Response

The left fossil was a meat-eater because of it's sharp pointed teeth. The sharp pointed teeth make it a meat-eater because a meat-eater needs sharp teeth to tear meat off its prey. Also the left fossil is a meat-eater because it has eyes in the front of its head. That makes it a meat-eater because most meater-eaters hunt so they need eyes in the front of their heads so they can find prey easier.

The right fossil is a plant-eater because it has eyes on the sides of its head. A plant-eater needs eyes on the sides of its head so it can watch out for incoming predators . Also, the right fossil is a plant-eater because it doesn't have sharp pointed teeth. A plant eater needs flat, molar-like teeth so it can grind up plants.

← Student correctly identifies the meat-eater and provides an explanation (with some details) that is based on specific structures of the animal (i.e., sharp pointed teeth and eyes in the front of its head).

← Student correctly identifies the plant-eater and provides an explanation (with some details) that is based on specific structures of the animal (i.e., eyes on the side of its head and flat, molar-like teeth).

Overall, the response demonstrates a solid understanding of the differences in structures of carnivores (meat-eaters) and herbivores (plant-eaters).

ANNOTATED STUDENT RESPONSE
Grade 4 Science

Sample 4-Point Response of Student Work

Student Response

A) Picture A is a meat-eater. Meat-eaters have eyes in the front of their had and have sharp teeth. Meat-eaters have to have eyes in the front of their heads so they can spot the animals they want to hunt. Their sharp teeth are for eating the meat of the animals they catch. If a meat-eater had flat teeth, how would it be able to tear and eat all the meat?

B) Picture B is a plant-eater. Plant-eaters have eyes on the sides of their head. Plant-eaters need eyes on the sides of their heads so they can look out for their enemies on both sides. They don't need sharp teeth because all they eat is plants that are usually soft. Flat teeth are fine.

← Student correctly identifies the meat-eater and provides an explanation (with some details) based on specific structures of the animal (i.e., eyes in the front of the head and sharp teeth).

← Student correctly identifies the plant-eater and provides an explanation (with some details) based on specific structures of the animal (i.e., eyes on the side of the head and flat teeth).

Overall, the response demonstrates a solid understanding of the differences in structures of carnivores (meat-eaters) and herbivores (plant-eaters).

ANNOTATED STUDENT RESPONSE
Grade 4 Science

Sample 3-Point Response of Student Work

Student Response

In the two pictures there is a meat-eater and a plant-eater. I am going to tell you which is which and why.

The animal with the sharp teeth is the meat-eater. It has a bigger jaw and bigger pointed teeth made for cutting up meat.

The animal with the flat teeth is the plant-eater. It has a smaller jaw for grinding up plants and flowers.

Can you tell which animal is which?

Student correctly identifies the meat-eater and provides a general explanation based on specific structures of the animal (i.e., its large jaw and sharp teeth). There is no discussion related to the animal's eyes.

Student correctly identifies the plant-eater and provides a general explanation based on specific structures of the animal (i.e., its smaller jaw and flat teeth). Again, there is no discussion related to the animal's eyes.

Overall, the response demonstrates an understanding of the differences in the structures of animals that are carnivores (meat-eaters) and herbivores (plant-eaters).

ANNOTATED STUDENT RESPONSE
Grade 4 Science

Sample 2-Point Response of Student Work

Student Response

First is a meat eater his teeth is sharp. Second is a plant eater his teeth is Flat.

The student correctly identifies the meat-eater and the plant-eater, but the explanation of the animals' structures is limited. Though the student does identify one structure that distinguishes the two animals (i.e., their teeth), no explanation is provided as to why their teeth are different.

Overall, the response shows a limited understanding of the differences in the structures of animals that are carnivores and herbivores.

Sample 1-Point Response of Student Work

Student Response

I think the one that is frist came from the meat eater and the one that is next came from the plant eater. I think the one that is from meat eater because it is biger and the other one is smaller.

The student correctly identifies the meat-eater and the plant-eater, but provides no meaningful explanation.

Overall, this response shows a minimal understanding of the differences in the structures of animals that are carnivores (meat-eaters) and herbivores (plant-eaters).

INSTRUCTIONAL STRATEGIES
Grade 4 Science

The open-response item **"Meat-Eaters and Plant-Eaters"** was designed to assess students' ability to (1) identify features of a fossil skull that relate to the animal's characteristic food and (2) explain how each of the features relates to the feeding habit. Suggestions of features to be observed were given in the prompt to encourage higher level explanations. The instructional strategies below present ideas for helping students explore and master these concepts and skills.

Discuss the following concepts and skills with students:

- All structures of living organisms have specific functions that assist growth and survival.
- Organisms have basic needs and can only survive if these needs are met.
- Careful observation and description are important for communication among scientists and others.
- Fossils retain structures, including bones and teeth, that can be used to identify the feeding and living habits of an animal, even when no living members of the species remain to be observed directly.
- Differences in structures of otherwise similar animals (e.g., feet, beaks, wings, teeth, fur or feathers) can be directly related to their food habits and/or habitats.

Have students work individually, in pairs, in small groups, and/or as a class to complete any or all of the following activities:

- Examine collections (or pictures) of birds, concentrating on specific structures such as beaks/bills, foot structure, and wing type. After studying the kind of food that one of the birds prefers, make a poster showing how the preferred type of food matches the structures of the bird. Discuss how the bird's structures help it obtain and eat its food.
- Hang bird feeders containing different types of bird food (e.g., large and small seeds and nectar) and carefully observe and record the structures of the birds that visit each type of food source. Create a poster to show the findings and explain the observations.
- Select an animal that is unfamiliar. Research what the animal eats. Describe in an oral presentation how the animal's body structures match the type of food it eats.
- Examine a collection of animal skeletons in the classroom or at a local museum. Use pictures or computer pictures if real skeletons are not available. After studying the skeleton of one of the animals, write a report on what the animal most likely eats and what habitat it lives in. Then research information about the animal and discuss whether or not your predictions were correct.